

What is claimed is:

1. A split type connecting rod comprising:
  - a crank-pin hole;
  - a valley formed on an inner circumferential surface
  - 5 of the crank-pin hole; and
  - a fracture starting point groove formed at the base portion of said valley.
2. The split type connecting rod according to claim 1, wherein a width of said fracture starting point groove
- 10 is less than a width of said valley.
3. The split type connecting rod according to claim 1, wherein said valley is formed such that said base portion is located at a position where a ratio of a depth of said fracture starting point groove to a shortest distance
- 15 from an opening of said fracture starting point groove to a bolt hole is about 70% or more.
4. The split type connecting rod according to claim 1, further comprising a bearing locking groove provided on said inner circumferential surface of the crank-pin hole,
- 20 wherein said valley is formed at a position opposite to the bearing locking groove provided on said inner circumferential surface of the crank-pin hole.
5. The split type connecting rod according to claim 4, wherein said bearing locking groove includes a pair of
- 25 concave portions located at positions that are deviated in the circumferential direction of said inner circumferential surface of the crank-pin hole.
6. The split type connecting rod according to claim 5,

wherein a width of said valley in the circumferential direction of said inner circumferential surface is less than a width of the pair of concave portions of said bearing locking groove in the circumferential direction of said inner circumferential surface.

7. The split type connecting rod according to claim 1, wherein the split type connecting rod is a nut-less type of connecting rod that is made of one of forged material, a cast material and a sintered material.

8. The split type connecting rod according to claim 1, further comprising a small end portion and a large end portion, wherein the large end portion includes the valley and the fracture starting point groove are formed in the large end portion.

9. The split type connecting rod according to claim 1, further comprising a rod portion and a cap portion.

10. The split type connecting rod according to claim 1, wherein a pair of the fracture starting point grooves are formed on the inner circumferential surface of the crank-pin hole.

11. The split type connecting rod according to claim 10, wherein an angle relative to a predetermined fracture plane passing from a shaft center of the crank-pin hole through a bottom portion in a bottom surface of the pair of fracture starting point grooves is approximately 45 degrees.

12. The split type connecting rod according to claim 11, wherein an interior angle of the valley is approximately

90 degrees.

13. The split type connecting rod according to claim 10,  
wherein upper and lower inner surfaces of the fracture  
starting point grooves are formed such that an angle  
5 relative to a predetermined fracture plane passing from  
a shaft center of the crank-pin hole through a bottom  
portion in a bottom surface of the pair of fracture starting  
point grooves is about 0 degrees.

14. The split type connecting rod according to claim 1,  
10 wherein a cross section of the valley is larger than a  
cross section of the fracture starting point groove.

15. The split type connecting rod according to claim 1,  
wherein the valley includes a pair of sloped portions.

16. The split type connecting rod according to claim 15,  
15 wherein the sloped portions define chamfers for guiding  
a bi-partitioned bearing metal element that is inserted  
into the crank-pin hole.

17. The split type connecting rod according to claim 11,  
wherein the sloped portions have curved shapes.

20 18. The split type connecting rod according to claim 11,  
wherein the sloped portions have swelled, rounded shapes.

19. The split type connecting rod according to claim 1,  
wherein the valley has a concave shape in an upper corner  
thereof.

25 20. The split type connecting rod according to claim 1,  
wherein the valley has a rectilinear shape in an upper  
corner thereof.

21. The split type connecting rod according to claim 1,

wherein the fracture starting point groove includes substantially parallel walls which form an angle of about 0 degrees with respect to a predetermined fracture plane, and includes a substantially parallel groove having a bottom surface which connects the substantially parallel walls and forms an arc shape with a radius of R.

22. The split type connecting rod according to claim 21, wherein a depth H from the inner circumferential surface of the crank-pin hole to a bottom portion of the bottom surface and the radius R are set such that a ratio  $H/R$  is about 1.0 to about 10.0.

23. An engine comprising the split type connecting rod according to claim 1.

24. A vehicle comprising the split type connecting rod according to claim 1.

25. A method of forming a split type connecting rod, the method comprising the steps of:

providing a connecting rod;  
forming a crank-pin hole in the connecting rod;  
forming a valley on an inner circumferential surface of the crank-pin hole, the valley including a base portion;  
and

forming a fracture starting point groove at the base portion of said valley.

26. The method according to claim 25, wherein said fracture starting point groove is formed after said valley is formed in said inner circumferential surface of the crank-pin hole.

27. The method according to claim 25, further comprising the steps of:

providing surface hardening treatment to the split type connecting rod;

5       fracturing and splitting the split type connecting rod into a rod portion and a cap portion to form fractured surfaces on both of the rod portion and the cap portion;

aligning the fractured and split rod portion and cap portion with each other by contacting both fractured

10       surfaces with each other; and

coupling the rod portion and the cap portion together via coupling bolts.

28. The method according to claim 25, wherein a pair of the fracture starting point grooves are formed by notching  
15       via one of cutting, wire cutting and machining using a laser.

29. The method according to claim 25, wherein the valley is formed by chamfering upper and lower corners between the inner circumferential surface of the crank-pin hole  
20       and the fracture starting point grooves.

30. The method according to claim 25, wherein the valley is formed by one of machining, forging, casting and sintering.